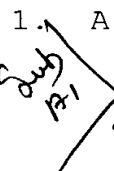


## WHAT IS CLAIMED IS:

1. A heat exchanger panel comprising:

 a first panel;

a second panel; and

a fluid containment device sandwiched between said first and second panels, said fluid containment device not being attached to either of said first and second panels.

2. A heat exchanger panel according to claim 1, wherein each of said first and second panels is formed from a high temperature composite material.

3. A heat exchanger panel according to claim 2, wherein said high temperature composite material comprises a carbon/carbon composite material.

4. A heat exchanger panel according to claim 2, wherein said high temperature composite material comprises a carbon/silicon carbide composite material.

5. A heat exchanger panel according to claim 1, wherein said first panel is formed from one of a carbon/carbon composite material and a carbon/silicon carbide composite material and said second panel is formed from one of a carbon/carbon composite material and a carbon/silicon carbide composite material.

6. A heat exchanger panel according to claim 1, further comprising at least one composite fastener for joining said first panel to said second panel.

7. A heat exchanger panel according to claim 6, wherein each said composite fastener comprises a shaft formed from a composite material, said shaft having a first bore, a metal sleeve having an orifice for receiving a portion of said shaft and a second bore extending perpendicular to said orifice, and a locking pin which is inserted into said second bore and said first bore for securing said shaft to said metal sleeve.

8. A heat exchanger panel according to claim 7, further comprising said metal sleeve having an exterior thread and a threaded nut for engaging said exterior thread on said metal sleeve.

9. A heat exchanger panel according to claim 6, wherein said at least one composite fastener further attaches said heat exchange panel to a substructure.

10. A heat exchanger panel according to claim 1, further comprising each of said first and second panels having a surface feature on an interior surface to accommodate said fluid containment device.

11. A heat exchanger panel according to claim 10, wherein said fluid containment device comprises a plurality of tubes and said surface feature on each interior surface comprises a plurality of arched portions.

12. A heat exchanger panel according to claim 10, wherein said fluid containment device comprises two joined metallic sheets formed to create fluid passages and said surface feature on each

*L* *R*  
interior surface comprises a plurality of arched portions separated by planar portions.

13. A heat exchanger panel according to claim 10, wherein said fluid containment device comprises a metallic heat exchanger with planar face sheets and said surface feature on each interior surface comprises a planar surface feature.

14. A heat exchanger panel comprising:

a first panel formed from a high temperature composite material;

a second panel formed from a high temperature composite material; and

a fluid containment device sandwiched between said first and second panels.

15. A heat exchanger panel according to claim 14, further comprising at least one composite fastener for joining said first panel to said second panel.

16. A heat exchanger panel according to claim 14, wherein said high temperature composite material forming said first and second panels is selected from a group consisting of a carbon/carbon composite material and a carbon/silicon carbide composite material.

17. A wall system for use in a propulsion system, said wall system comprising:

at least one heat exchanger panel;

 said at least one heat exchanger panel having an outer panel and an inner panel;

each of said outer and inner panels being formed from a high temperature composite material; and

a coolant containment device sandwiched between said outer and inner panels.

18. A wall system according to claim 17, further comprising said coolant containment device not being fastened to either of said outer and inner panels.

19. A wall system according to claim 17, further comprising a substructure and at least one fastener for securing said outer and inner panels to said substructure.

20. A wall system according to claim 19, wherein each said fastener comprises a composite fastener.

21. A wall system according to claim 19, wherein said at least one fastener has a shaft formed from a non-metallic material and a first bore in said shaft, a metallic sleeve having an orifice for receiving an end portion of said shaft and having a second bore at an angle relative to said orifice, and a locking pin for joining said shaft to said metallic sleeve, said locking pin being inserted into said first and second bores.

22. A wall system according to claim 21, wherein said inner panel and said substructure each have a bore for receiving a portion of said shaft.

*23.* A wall system according to claim 17, further comprising a plurality of heat exchanger panels and said heat exchanger panels being aligned along a longitudinal axis of said wall system.

*24.* A wall system according to claim 17, further comprising a leading edge formed from a composite material.

*25.* A wall system according to claim 19, further comprising means for injecting fuel into a space bounded by said wall system.

*26.* A wall system according to claim 25, wherein said fuel injecting means comprises a fuel inlet conduit, a manifold connected to said fuel inlet, and a plurality of injection nozzles connected to said manifold.

*27.* A wall system according to claim 26, wherein said outer panel has an outer surface with a plurality of openings and each of said injection nozzles extends through said openings and above said outer surface.

*28.* A wall system according to claim 26, wherein said outer panel has an outer surface and a plurality of openings and each of said injection nozzles has an outlet flush with said outer surface and aligned with one of said openings.

*29.* A wall system according to claim 26, wherein said outer panel has an outer surface and a plurality of openings and each of said injection nozzles extends to a point just below said outer surface and is aligned with one of said openings.

*sub A*

30. A wall system according to claim 17, further comprising said outer and inner panels each extending from a point near a leading edge of said wall system to a point near a trailing edge of said wall system.

31. A wall system according to claim 30, wherein said coolant containment system comprises a plurality of tubular passageways extending parallel to a longitudinal axis of said wall system.

32. A wall system according to claim 17, further comprising an inner panel extending from a point near a leading edge of said wall system to a point near a trailing edge of said wall system and said outer panel comprising a plurality of axially aligned panels.

33. A wall system according to claim 17, wherein said inner panel is a discontinuous panel.

34. A wall system according to claim 17, wherein said inner panel is formed from a plurality of spacers and said coolant containment device comprises a plurality of tubular passages separated by said spacers.

35. A wall system according to claim 17, wherein said propulsion system comprises a scramjet engine.

36. A wall system according to claim 17, wherein said propulsion system comprises a rocket engine.

37. A wall system for use in an air breathing propulsion system comprising:

at least one heat exchanger and a substructure;

*A1*) said at least one heat exchanger having an outer panel formed from a composite material and a coolant containment device bounded by said outer panel; and

means for fastening said outer panel to said substructure.

38. A wall system according to claim 37, wherein said coolant containment device comprises a plurality of tubular passageways and said heat exchanger further comprises a plurality of spacers between said tubular passageways.

39. A wall system according to claim 37, further comprising means for injecting fuel into a space bounded by said wall system.

40. A wall system according to claim 37, wherein said composite material is selected from the group consisting of a carbon/carbon composite material and a carbon/silicon carbide composite material.